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The effect of a stage of change tailored intervention on physical activity and psychological states of older adults

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The Effect of a Stage of Change Tailored Intervention on Physical Activity and Psychological States of Older Adults

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PUBLIC PRESENTATION

This work is accepted for presentation, in part or in full, at the Kinesiology Honors Symposium on April 19th, 2018.

Dedication Page

This work is dedicated to my grandmother, Gladys Blosser, whose selflessness, passion for others, and kindness has always inspired me to develop meaningful relationships with people. My idea for the project came from my interest in the older adult population with having such a good relationship and inspiration from my own grandparents.

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Abstract

The Effect of a Stage of Change Tailored Intervention on Physical Activity and Psychological States of Older Adults

Introduction: As life expectancy increases in the United States, activity promotion programs aim to help older adults continue to remain happy, healthy, and productive. Programs that facilitate exercise and lifestyle changes can offset regular age-related declines and improve participation in regular fitness programs. Developing more active lifestyles can help the elderly maintain independence in their everyday activities.

Purpose: The goal of this study was to determine the effectiveness of a physical activity intervention tailored to participants' stage of change on attitudes towards physical activity, self-efficacy, and decisional balance in older adults.

Methods: This project involved teaching a curriculum to a group of older adults at a retirement community with independent and assisted living communities. The course covered a span of 8 weeks during which participants met once per week. The curriculum covered information about health and exercising, processes of change associated with participants' current stage of change, and instruction of simple exercises. The impact of this intervention was assessed using surveys and a focus group to determine the effectiveness of the curriculum in improving physical activity perceptions and behaviors.

Results: There were five participants enrolled in the course; however, only three had data for both pre-and post-intervention assessments. Two of the three individuals stayed in the maintenance stage throughout the entire course, while one participant started out in preparation, but then progressed to the action stage by the end of the intervention. Significant differences from pre-and post-intervention were not seen for the Modifiable Activity Question (MAQ),

Exercise Confidence Survey, or Decisional Balance Scale. However, two participants had an increase in their hours/week and METs*hrs/week of physical activity as reported by the MAQ. Two participants also had an increase in their Exercise Confidence Survey score while the Decisional Balance scale showed that the participants focused slightly less on the cons of exercise following the intervention. The focus group conducted at the end of the intervention revealed that participants liked having specific exercise information sheets and enjoyed the class material and presentation style. The focus group also showed that some participants felt encouraged to continue to exercise and increase their exercise amounts.

Discussion: With the progression in stage placement of the TTM, a person generally perceives physical activity in a more positive way and is more likely to adopt exercise into their lifestyle. In order to assist people in progressing through the stages of change, a tailored intervention may be more effective. This study used staged-matched processes of change discussion to promote more positive attitudes towards exercise as well as a health education curriculum to engage the participants. As a person moves through the TTM stages, they generally increase in their self-efficacy as well as view more advantages to adopting exercise into their regular routine. With a small sample size and resulting limited data, it was difficult to form generalizable conclusions.

The Effect of a Stage of Change Tailored Exercise Curriculum on Physical Activity and Psychological States of Older Adults

Chapter I: Introduction

The population of people over the age of 65 in the United States is growing. In the year 2016, the age range of 65 and over, accounted for 15.2 % of the total population, which was an increase from the previous percentage of 13.0 % in 2010 (United States Census Bureau 2016). The elderly have different physical attributes and needs than the younger populations. Older adults perform movements more slowly and experience changes in their proprioception due to their age (Kaplan, Nixon, Reitz, Rindfleish, & Tucker, 1985). Elderly individuals are susceptible to body changes like decreases in muscle mass that can contribute to reductions in strength (Hughes et al., 2001). Also of importance regarding older adults is the prevalence of falls. A high number of hospital visits and causes of injuries for the elderly are associated with falls and the problems that can occur because of them (Williams et al., 2015). Older adults may also need assistance with everyday activities such as dressing themselves, bathing, or even housework, which may determine their level of disability (Williams, Lyons, & Rowland, 1997). According to Rowlands and Lyons (1991) there are health issues, such as chronic diseases, that can cause individuals to need more medical care (as cited in Williams, Lyons, & Rowland, 1997).

However, even with the age-related declines like muscle mass, Cutler (2001) explains that older individuals are now healthier, have a lower risk of death, and require less assistance than elderly in the past. Some reasons that explain this shift are medical advancements in surgical and pharmaceutical therapies. People also know more about healthy food choices and the use of safety equipment like walkers and railings (Cutler, 2001). With elderly being healthier, the need arises for activities to keep them actively engaged. Promoting more physical activity

opportunities for that age group can only further enhance progress towards productive, healthy lifestyles. Even with increased longevity and health improvements in this population, Vogel et al., (2009) and Giuli, Papa, Mocchegiani, and Marcellini (2012) noted older adults are not a group that usually exercises. Another study focused on the physical activity habits of older adult Dutch men and showed a regression of health, reduced speed in performing everyday activities, and low motivation could all be factors to explain a decrease in physical activity due to age (Bijnen, Feskens, Caspersen, Mosterd, & Kromhout 1998). In comparing cultural factors, Dergance et al., (2003) found that fear of getting hurt and poor health were reasons for both Mexican and European elderly to not engage in physical activity. Due to the barriers that older adults experience with physical activity, it is important to find age-appropriate ways to emphasize physical activity so that there are opportunities for that age-group to stay engaged, continue to lead productive lives, and gain the benefits associated with exercise.

Benefits of Physical Activity

Exercise has many health benefits that can be gained across age groups and can slow age-related declines. Resistance exercise can slow the decline of muscle mass while aerobic exercise improves cardiovascular health (Evans, 1999). According to Vogel et al., (2009), exercise should play an important role in the lives of the elderly because the benefits that it can offer, which include longevity, improvements in cholesterol levels and hypertension, and body weight management. There are psychological benefits like improvements in mood, which can even be seen in resistance exercise programs with older adults (McLafferty Jr, Wetzstein, & Hunter, 2004).

Ory, Hoffman, Hawkins, Sanner, and Mockenhaupt (2003) also advocate that exercise should be incorporated in an elderly person's daily routine to give him/her a way to address

chronic diseases and the associated increase in cost of healthcare. However, according to Ory et al., (2003), health promotions that involve exercise are generally not directed toward elderly people. They also theorizes that stereotypes about elderly having missed the window for exercise to improve their health or that elderly have more stubborn tendencies, have impacted the amount of health programs offered for the aging population.

Effective Interventions in Elderly

Motivation and attitudes towards exercise can affect whether any individual will start or continue with an exercise plan. In order to change an older adults' view of exercise, it may be more effective to focus on the positives benefits (Rich & Rogers, 2001). However, motivating the elderly to exercise is not something that has a simple solution. A study by Hill et al., (2011) reported that after being released from a hospital following a variety of medical complications, many elderly were not likely to exercise because of pain, low social support, and/or negative attitudes towards exercise. If the elderly did not perceive themselves at risk of health complications like falling, then they did not view exercise to be important. Other factors that can pose a challenge for the elderly with exercise are the location and utilization of outside resources for physical activity. Most elderly prefer exercises and activities that allow them to stay in their home environment (Hill et al., 2011; Giuli, Papa, Mocchegiani, & Marcellini, 2012). Interventions for physical activity in older adults can be effective if attitudes towards physical activity are examined (Lee, Arthur, & Avis, 2008). Learning the attitudes elderly have towards exercise could help determine what approaches and language are effective in getting them to be more active.

Transtheoretical Model of Behavior Change

Some researchers have used perspectives from the Transtheoretical Model (TTM) of behavior change to encourage people to be active by better understanding components of their motivation toward physical activity (Prochaska, 2013; Prochaska, & Velicer, 1997). The concepts of the model came about in a study that examined smoking behaviors. The TTM brings together ideas from different aspects of psychology like Freudian and psychotherapy ideals (Prochaska, 2013; Prochaska, & DiClemente, 1986; Prochaska, & Velicer, 1997). Within the model are five stages of behavior change known as precontemplation (no present plans to begin exercising in the next 6 months), contemplation (beginning to think about exercising, starting in 6 months), preparation (starting to make concrete plans to exercise within 30 days), action (engaging/ have been engaging in regular exercise for the previous 6 months), maintenance (exercising for longer than 6 months and planning to continue) (Nigg, 2014). The stages of change show that behavior change is part of a continuing process, with progressive movement through the stages distinguished by different ways of thinking, levels of physical activity engagement, and responsiveness to specific processes of change (i.e., focused strategies to help with progression in the specific stages of the TTM). In order to progress to more advanced stages, it is advised that interventions be tailored such that stage-matched processes of change are addressed to help people evolve their thinking and behavior (Nigg, 2014). For example, experiential processes like consciousness raising and self-reevaluation, tend to be more useful for the beginning stages while the behavioral processes, like self-liberation and helping relationships, are more appropriate for the later stage placements (Nigg, 2014). See Appendix A for an inclusive list of stage-matched processes of change as explained in Nigg (2014). Over time, the model has been adapted to explain other behaviors, including but not limited to, health behaviors, lifestyle activity levels, depression, and alcohol abuse (Prochaska, 2013; Prochaska, &

Velicer, 1997).

According to Resnick and Nigg (2003), the TTM is an effective tool to assess how individuals' attitudes and behaviors can shift with exercise behaviors. Burbank, Reibe, Padula, and Nigg (2002) discuss a case study depicting a woman in the precontemplation stage where consciousness raising was one process of change used to help advance the woman in her exercise behaviors by making her aware of the positive benefits associated with exercise. Another case study in the article involved a man in the action stage where reinforcement management was used to impact exercise through rewards and praise. Shirazi et al., (2007) grouped middle aged women according to their TTM stage and developed education material about exercise that had stage of change specific components. The women who were part of the tailored intervention group experienced more advancements in their stages of change (Shirazi et al., 2007). Greaney et al., (2008) used print material that had stage of change specific exercise information for their intervention group and found that people who identified with the precontemplation stage experienced more progression in their stage of change than similar people without the tailored material. However, the early stages of the TTM, like the precontemplation stage, also had more of a likelihood of discontinuing the study. The current study will use the TTM to evaluate participants' attitudes and behaviors towards exercise. The TTM and related processes of change will also serve as a guide on how to adapt the intervention curriculum to each stage of the TTM presented in the participants.

Purpose

The purpose of this study was to examine whether a tailored curriculum based on the TTM Model was effective in changing a group of older adults' exercise behaviors, decisional balance, and self-efficacy as it relates to physical activity. The curriculum also incorporated

instruction of simple exercises that were done with minimal equipment so that the participants would have ways to continue physical activity on their own following the course.

Limitations

Limitations of this research were that no control group that did not get a tailored exercise curriculum was used as a comparison. Similarly, another limitation was that the participants already had a desire to self-select into the program, which limited the stages of the TTM present in the participants. Due to the time depictions for the stages of change, it was predicted that there would be no participants in the precontemplation or contemplation stages, as signing up for this program was an action towards being more active, which would place participants in at least the preparation phase.

Delimitations

This project was limited to persons ages 50 and older who are ambulatory. The curriculum was also limited to the areas of physical activity and exercise. The study did not include any participants with diagnosed conditions that affect cognition.

Hypotheses

If the tailored intervention is effective in helping the participants advance in their exercise attitudes and physical activity behaviors, then the results will show a shift in the TTM stage placement of the participants. That shift will be identified by an increase in self-efficacy, more positive thoughts towards exercise/decisional balance, and an increased interest in physical activity.

Chapter II: Design/Methods

Study Design

Participants met weekly for eight weeks in a classroom attached to a retirement community's fitness center. A pre-assessment of the participant's TTM stage of change, physical activity levels, self-efficacy, and decisional balance was conducted. The participants' attitudes towards exercise, using the TTM survey, were assessed roughly every two weeks. Physical activity levels, self-efficacy, and decisional balance were only assessed pre- and post-intervention. The intervention curriculum covered topics to educate older adults about exercise, empower them to make healthy lifestyle changes/choices, and help them positively view exercise. Movement through stages of the TTM model were assessed using questionnaires and a focus group following the end of the curriculum. This study was approved by the Institutional Review Board at James Madison University (Appendix H & H-1)

Participants

Participants, ages 50 and older, from the independent and assisted living communities of a retirement community and/or its fitness center were informed about participation in the intervention. Participants had to be ambulatory and have no diagnosed conditions that affected cognition. Participants were recruited using a flyer that was advertised in the fitness center. Also, an ad was put in the monthly newsletter that goes out to residents of the retirement community. Residents then contacted the fitness center to sign up for the class.

Measures

Participants' stages of change relative to physical activity were assessed by questionnaire (Burbank, Reibe, Padula, & Nigg 2002; Appendix B). The TTM survey is a one item checklist

that identifies the participants' TTM stage placement. It was administered as a pre- and post-measurement. It was also given roughly every two weeks (during weeks one, four, six, and eight) to evaluate any changes to the participants' TTM stage placement so that individuals could be shifted to the appropriate group to continue to receive appropriately tailored information and guidance throughout the intervention.

Physical activity was assessed by the Modifiable Activity Questionnaire (MAQ; Gabriel, McClain, Schmid, Storti, & Ainsworth 2011; Appendix C), to evaluate if the participants' activity level and type of activity changed from pre- to post-intervention. The MAQ provides a list of activities that participants choose from to record how much time they spend performing those activities in the past week. The MAQ records the hours/week the participants engage in activity, which can then be converted to MET*hrs per week (metabolic equivalents * hours / week). Examples of activities included in the MAQ are walking, household cleaning, and bicycling. There is also the option for participants to add any activities that were not included in the original list.

Self-efficacy, as it relates to exercise, was evaluated by the Exercise Confidence Survey (Sallis, Pinski, Grossman, Patterson, & Nader, 1988; Appendix D). The survey asks questions that pertain to a person's confidence in being able to incorporate exercise into their daily lives and is rated on a 5-point Likert scale. Decisional Balance was evaluated using the Decisional Balance Scale (Nigg & Riebe, 2002; Appendix E). The 10-item survey uses a 5-point- Likert scale that addresses whether people cite positive (pros) or negative (cons) reasons to exercise. The scale also has a social aspect as it asks questions pertaining to the influence of family and friends on the participants' exercising behaviors. The Decisional Balance Scale was scored by summing up the pros and cons and then subtracting the cons from the pros. The MAQ, Exercise

Confidence Survey, and Decisional Balance Scale were administered pre- and post-intervention.

Finally, a semi-structured focus group lasting approximately 10 minutes was conducted and audio-recorded at the end of the intervention. The interview occurred in the same classroom after the participants had filled out their final questionnaires during the last week of the class. The interview had several questions that covered if the participants felt the curriculum was effective, enjoyed the exercises taught, and/or the health information was helpful (see Appendix F for the complete interview guide). The researcher asked follow-up/additional questions when possible and appropriate. The focus group interview was then transcribed, cleaned, and coded to find similarities in the remarks of the participants by identifying pertinent meaning units, lower ordered themes, higher ordered themes, and overall categories.

Intervention

The curriculum was organized into lesson plans used by the researcher over the eight week intervention period. The researcher presented information for the class in ways such as paper handouts and visual/verbal instructions. The information for the class was also approved by the Program and Fitness Manager of the facility to ensure that it was appropriate for the participants.

Health Education Curriculum: Topics for the curriculum included an introduction to exercise safety and recommendations for exercise based on the Office of Disease Prevention and Health Promotion (Office of Disease Prevention and Health Promotion, 2008). Participants also created goals using the S.M.A.R.T. goal method (Doran, 1981). Other topics included weight management, body composition, aerobic vs. resistance exercise, and health benefits of exercise. These topics were discussed with the participants as a whole at the beginning of the class.

Participants were encouraged to ask questions/input comments anytime throughout the course.

Processes of Change Discussions: The participants were separated into groups based on their self-identified stage of change. The stage of change groups then received a worksheet based on stage-relevant processes of change to help the participants think about physical activity, themselves, and related factors in a way that could help them move to the next stage of change. The researcher picked one stage-matched process of change for each group to focus on per week and came up with questions/activities to facilitate discussion pertaining to that processes of change. For example, an action group might have been asked to focus on one of the processes of change, helping relationships, by thinking of who they could gain support from to help them adhere to their physical activity plans (Nigg, 2014).

Exercise for the Week: The participants then came back together as a group, and the researcher explained the exercise being taught for the week. The researcher demonstrated the exercises taught. The exercises covered the major body parts including the legs, arms, and core muscles. Participants were given an exercise sheet that was created by the researcher that had a picture and instructions on how to do the weekly exercise. The exercise sheet was given so that the participant could continue doing the exercises on their own if they so choose.

Overview of class session:

1. Greetings
2. TTM survey to update groups (Weeks 1, 4, 6, and 8)
3. Health Education topic to whole class - 10 mins
4. Processes of change discussion within TTM stage of change groups - 20 mins
5. Demonstration of Exercise of the Week to whole class - 10 mins

6. Participants practice/perform their specific exercise until remainder of class - 5 mins

**Exception to overview were for the first and last class to administer the Questionnaires.*

Data Analysis

The information from the surveys were recorded and input into a Microsoft Excel (Version 2013) spreadsheet. On each of the surveys, a paired, 2-tailed *t*-test was done to discover if the results were significant. The paired, 2-tailed *t*-test significance was set a priori at $p < 0.05$. The focus group conducted during the last class was transcribed and then the recording was deleted. The interview was coded to find similarities in the remarks of the participants by identifying meaning units, lower ordered themes, higher ordered themes, and overall categories. The coding results were reviewed by a secondary researcher and discussion of the meaning units, themes, and categories took place until consensus among the researchers was reached.

Chapter III: Results

Results

Participation: At the first class, there were five participants. From those five participants, the initial questionnaire data was retrieved. One participant from the starting five chose to discontinue the class. Attendance varied throughout the eight weeks of the class, with at least one participant attending each class period. Of the three participants that completed the intervention, they attended an average of 4.33 class days of the curriculum. During the third week of the class, a new participant joined. At the last class of the program, three of the five participants were in attendance to take the final questionnaires.

Stage of Change. The pre-intervention results of the TTM survey (Appendix B) were that three of the participants were in the maintenance stage and two were in the preparation stage. Table 1 gives an overview of the scores of each participant for each time the TTM survey was administered. For two of the participants who identified as being in the maintenance stage at baseline, meaning that they had been exercising for 6 months or more, no change was seen in the TTM score during the curriculum (Nigg, 2014). One participant in the preparation stage did show an increase to the action stage by the end of the curriculum.

Self-Reported Physical Activity. The MAQ (Appendix C) reported that the participants engaged in a moderate amount of physical activity. When examining all participants who enrolled, the pre-intervention ranged from 1.17 – 18.67 hours/week and 3.62 – 47.67 METs*hrs/week of physical activity. When limited to participants with both pre- and post-intervention data, the range was 7.25 – 18.67 hours/week and 15.25 – 47.67 METs*hrs/week pre-intervention and the post-intervention ranges were from 4.34 – 20.57 hours/week and 11.44 – 59.67 METs*hrs/week (Table 2). Of the three participants who were available to get pre- and

post-intervention measurements, two of the participants increased their amount of physical activity hours/METs*hrs per week. One participant did have a decrease in the amount of physical activity hours/METs*hrs per week (Table 2). For both the hours/week and the METs*hrs/week, the paired *t*-test indicated that there was not a significant difference pre- and post-intervention - ($p = 0.858$ & $p = 0.358$, respectively).

Exercise Confidence. The Exercise Confidence Survey (Appendix D) given showed that two of the participants reported an increase in their score from pre- to post-intervention, with an average increase of 6.5 points from the pre-intervention assessment (Figure 1). However, one participant reported a decrease of 7 points in their score following the intervention (Figure 1). The average score of all the participants pre-intervention was 34 out of a possible 60 points. When limited to participants with both pre- and post-intervention data, the average pre-intervention score was 34.3 and the average score post-intervention was 36.3 out of a possible 60 points. The pre- and post-intervention scores were not significant as indicated by a paired *t*-test ($p = 0.701$).

Decisional Balance. For the Decisional Balance Scale (Appendix E), there was not a significant difference between the score of the cons pre- and post-intervention, or the scores of the pros pre-and post-intervention ($p = 0.270$ and $p = 0.225$, respectively; Table 3). When subtracting the cons from the pros, all participants who enrolled had an average score of -10.8, indicating subjects perceived more cons than pros to exercise. When limited to participants with both pre- and post-intervention data, the average score of subtracting the cons from the pros was -8.67 pre-intervention and then -8 post-intervention. All scores pre- and post- were negative meaning that the participants focused more on the cons, however following the intervention there was a slight less focus on the cons (Table 3).

Focus Group. Participants were assigned a code (e.g., P1, P2…) per their responses in order to report their data anonymously and illustrate the diversity of the responses provided. During the coding process, two global categories stood out from the data: *curriculum components* and also *curriculum impact*. For the curriculum components, the exercises and education were categories that stood out. For the exercises, the participants mentioned that having the print out of the instructions as well as pictures of the exercises were helpful. For example, one individual stated, "It helps motivate me to get going. You know to have the pictures of you doing the exercise" (P1). Another participant said, "I think it was mentioned already, having the, the pages that you did with the actual photograph of the exercise and the description. That's very helpful" (P3). However, some of the exercises did cause the participants some difficulty in executing them on their own. The exercises required the participants to utilize a full range of motion at some joints that caused for some difficulty in the participants performing them as one participated stated, "Older people tend to stiffen with age, for various reasons and most of these exercises we could have done some years back with no trouble, but we're just not as limber as we used to be" (P1).

In the education piece of the curriculum, the material was found interesting by the participants. The topics for the health education piece were well liked as one participant mentioned, "I found the class material of interest. I learned some things I probably either didn't know or I had learned a long time ago and didn't remember until you mentioned it" (P3). However, there was a comment about the education piece needing more of a specific focus into certain diseases.

Also in regard to the curriculum component, the environment and the presentation quality were categories when coding. The fact that the class involved a group of people that could

interact was well liked as one participant said, “That was the most encouraging part of this class –Interaction for me. Hearing what other persons knew and experienced was part of that” (P2). The participant enjoyed hearing the thoughts of their classmates and liked the discussions that they were able to engage in. For example, one individual mentioned, “That’s true, that made the class interesting to have other people, you know. For all of us to speak to any question that you might have asked, made it more interesting” (P1).

The participants also remarked that the presentation style aided in their understanding and interest in the curriculum. One participant said, “I can’t think of anything more that I would have needed. I just felt that it was excellent education, well presented, and understandable. And it made me feel good about what I’ve been doing” (P2). The participants were able to have a good relationship with the researcher during the course of the class. One participant mentioned, “And I think your level of enthusiasm is very good. It kept us going”, and also said “and I think that you as a young person, showed empathy for us, by not being pushy about it” (P1).

The curriculum impact was the second global category that stood out from the focus group. From the curriculum impact category, the main theme was of physical activity motivation. From the curriculum, the participants remarked being more encouraged to engage in physical activity and keep up with their fitness. For example, one individual said, “I’m going to continue going to the wellness center… I feel happy that I’m on a schedule” (P1). The curriculum also had the impact to increase/provide new knowledge to the participants as one participant mentioned, “I found the class material of interest. I learned some things I probably either didn’t know or I had learned a long time ago and didn’t remember until you mentioned it” (P3).

Chapter IV: Discussion

This tailored physical activity intervention was relatively effective in showing a shift in the TTM stage placement as one participant did progress in their stage placement. Overall, two of the three participants reported an increase in their physical activity time on the MAQ by increasing both their hours/week and METs*hrs/week of physical activity. Two of the three participants may also have increased their self-efficacy as indicated by an increase in the score of their Exercise Confidence Survey. Also, the participants reported a less negative score on the Decisional Balance Scale, indicating that they focused slightly less on the cons of exercise following the intervention. The focus group highlighted that the participants liked having specific exercise information sheets, enjoyed the class material, and presentation style. Following the intervention, the focus group also showed that some participants were encouraged to continue to exercise and increase their time spent exercising.

The change in the stage placement of the participants was difficult to examine as three participants were in the maintenance stage at the beginning of the intervention. The maintenance stage is the final stage, meaning that participants had already been engaging in regular physical activity for 6 months. Changes from that stage are less likely than previous stages (Nigg, 2014). One of the participants did first conclude that she was in precontemplation; however, after further explanation of the definition of exercise presented in the TTM survey, the participant changed their self-reported categorization to the maintenance stage, which was deemed more appropriate by the researcher. Also since signing up for the class showed that participants had an interest in exercise/physical activity, it was not expected to have participants in the precontemplation or contemplation stage (Griffin-Blake & DeJoy, 2006). Of the participants in the preparation stage, progression in stage placement could occur, which was seen in the

progression of one participant to the action stage (Table 1). Parschau et al., (2011) found that if a person took time to plan to be more active, they were more likely to advance in the stages. In the present study, one class was focused on setting detailed goals, which may have influenced the participant to be proactive to change/make new behaviors. Locke and Latham (2002) discuss how having a clearly defined as well as challenging goals can better help a person be motivated to change. The specifics of the goal help make it clear what a person needs to accomplish The present study also took place where participants could easily have access to a fitness center to facilitate their plan to go there to exercise. The participant who did progress did discuss her plan of attending a fitness center in the focus group, which may have been the reason for her to indicate the progression in the TTM survey. Having the tailored Processes of Change discussion in the curriculum could have also influenced the stage progression. The research of Shirazi et al., (2007) and Griffin-Blake and DeJoy (2006) found that groups that had tailored TTM stage components to their intervention, reported progression in their stage placement.

If the intervention was successful, it was predicted to see increased amounts of physical activity because stage progression is based around exercise habits. More progressed stages of change are associated with people who perform more physical activity (Marshall & Biddle, 2001). The present study's limited findings provides support that as the participant in the maintenance stage, as well as the participant that progressed to the action stage, increased their physical activity (Table 2). Peterson and Aldana (1999) also found that matching a person to their stage of change and giving them information tailored to their stage does impact participants' levels of activity, but more on a short-term basis. This study only lasted 8 weeks, so the two participants' with increased activity level happened in a relatively short amount of time, and there will not be follow-up with participants to know if they have continued in their exercise

behaviors. With relapsing possible in exercise behaviors Marcus, Selby, Niaura, and Rossi, (1992) found that participants in the preparation stage may have an increased rate of dropping out of exercise. For the participants in the present study where data was collected pre- and post-intervention, it was an individual in the maintenance stage who had a decrease in their exercise amounts, which was not as expected as participants from the other TTM stages. Schutzer and Graves (2004) discuss that, in general, older adults have difficulty with engaging in and adhering to exercise regularly. Some barriers that older adults experience with exercise is connected to their health, environment as having access to safe workout areas/spaces, and the lack of understanding in how exercise can benefit their health (Schutzer & Graves, 2004). Also, another factor potentially contributing to this decrease in activity level was that the initial MAQ questionnaire was given in October and the last questionnaire was given in December. With the change in weather between those dates as December tends to be colder, the participants' physical activity could have been affected. However, most participants reported activities that could be done indoors with weather not having a significant impact on their ability to engage in those physical activities. Another limitation is the susceptibility of measures/questionnaires that have people report their previous physical activity to recall bias (Gabriel, McClain, Schmid, Storti, & Ainsworth, 2011).

With the participant who began the study in the preparation phase and then progressed in their stage placement to the action stage, as well as one of the participants in the maintenance stage, there was an increase in their Exercise Confidence Survey score (Figure 1). It may be easier for certain stages to experience changes in self-efficacy as Marshall and Biddle (2001) found that the amount of increase in self-efficacy from one stage to the next may be different depending on which stages are being assessed. A factor that could have aided in the participants

increasing their scores may have been with the group component of the intervention. McAuley, Jerome, Marquez, Elavsky, and Blissmer (2003) discuss that having a group class can promote more self-efficacy because of the social support it can provide to individuals. Also, exercising more often with a group that provides social support can increase self-efficacy as well. In the focus group, participants mentioned that they liked having a group class because they were able to interact and discuss/share experiences. However, the overall progression of confidence in exercise was difficult to assess in this study as there was not much movement in people's stage of change. There also could have been more discussion about confidence in physical activity and safety concerns included in the curriculum, which may have helped with increasing self-efficacy and preventing the one participant from having a decrease in their Exercise Confidence Survey score. While not specifically reported by the participants, another potential reason to generally explain a decrease in confidence is the prevalence of falling in older adults as some individuals may alter their habits to avoid risky situations/activities (Tinetti, Speechley, & Ginter, 1988). In order to combat the decrease in confidence, a study done by Cyarto, Brown, Marshall, and Trost (2008) found that an older adult's confidence in their balance could be increased using a program that they could do in their home. In this study, a sheet with instructions and pictures of the exercises of the week were given to participants weekly. The exercise sheets were created by the researcher so the participants would have something to take home with them that showed them how to do the exercises. The focus group revealed that the participants did find the exercise print-outs helpful.

In regards to decisional balance, it is generally thought that as a person progresses through the TTM stages, their outlook becomes less about the cons and more about the pros of exercising (Plotnikoff, Hotz, Birkett, & Courneya, 2001; Prochaska et al., 1994). Griffin-Blake

and DeJoy (2006) found that a change as people progressed from the preparation to the action/maintenance stages was viewing the cons as less of a barrier. In this study, results were consistent with those findings as the average pros minus the cons score for the participants with both pre- and post-intervention data became more positive by going from -8.67 to -8 (Table 3), indicating the participants were looking at cons slightly less following the intervention. In the Griffin-Blake and DeJoy (2006) study it was also found that there was not a significant change in a person's views of the pros of exercising when they progressed in their stage placement. This study was relatively consistent with those findings as the score of the pros pre- and post-intervention were not significant. In order to incorporate more pros of being physically active, one of the topics for the health education curriculum was focused on the benefits of exercise. The goal of that topic was to help participants be more aware/remind them of the benefits that increasing their level of physical activity can achieve, including health and mental benefits. In the focus group, a participant remarked that they found the class about the benefits of exercise interesting.

A major limitation of this study was that there was no control group to compare to the intervention group. There was just one group that got the intervention, so the participants could only be compared to themselves to understand how effective the curriculum was at increasing attitudes towards exercise and physical activity behaviors. Another limitation was the sample size. At the beginning of the course, there were five participants. However, only three participants were present in the last class to take the final questionnaires. If people from each stage could have been recruited, more knowledge would have been gained to see how each stage would have progressed through the tailored intervention. However, when conducting studies that have a stage placement, it is hard to recruit people who are in certain stages instead of just

recruiting people and then evaluating their stage placement (Griffin-Blake & DeJoy, 2006). In the present study, volunteers were recruited for a group class with no regard for what stage of change they may be in. With such a small sample size and missing data points, it is hard to generalize the results of this study and find significant changes.

Another area that posed a limitation was follow-up with the participants related to their completion of the exercises of the week. The participants were encouraged to do the exercises in class but did not have to report any follow-up measures of actual performance. Therefore, the researcher had no way of knowing if the exercises were being performed by the participants other than by asking in class. If the participants had been more frequently prompted, they may have had more of an increase in their physical activity levels. Brassington, Atienza, Perczek, DiLorenzo, and King, (2002) discuss that having check-ins about fitness progress and self-efficacy is important for older adults so that feedback can be given to assist them in furthering and adhering to their exercise behaviors. This study could have been improved if a control and intervention group, an increase in sample size, and more follow-up measures with participants could have been utilized to evaluate the tailored intervention. For further research, an effective direction would be to measure the impact of the intervention by using a control and intervention group. Also, a more in-depth look at the increase/decrease of older adult's confidence in exercise could be examined; specifically, the impact that the risk of falling has on older adults' confidence, which was not addressed in this intervention.

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Table 1. TTM survey results over the four times the survey was given for each participant.

	1st TTM survey	2nd TTM survey	3rd TTM survey	4th TTM survey
1	5	5	5	5
2	5	2		
3	3			
4	5	5	5	5
5	3	3	3	4

Note: 1 = precontemplation, 2 = contemplation, 3 = preparation, 4 = action, 5 = maintenance

Table 2. Modifiable Activity Questionnaire data for each participant pre-and post-intervention

	Hours/Week of Activity	
	Pre-intervention (hours)	**Post-intervention (hours)**
1	7.50	9.50
2	1.82	
3	1.17	
4	7.25	4.34
5	18.67	20.57
	METs*hrs/Week of Activity	
	Pre-intervention (METs*hrs)	**Post-intervention (METs*hrs)**
1	15.25	29.15
2	8.05	
3	3.62	
4	16.25	11.44
5	47.67	59.67

Table 3. Decisional Balance Scale scores of the participants' pre- and post-intervention.

	Pre-Pros	**Pre-Cons**	**Pre Pros - Cons**	**Post-Pros**	**Post-Cons**	**Post Pros - Cons**
1	15	25	-10	11	25	-14
2	12	25	-13			
3	9	24	-15			
4	17	21	-4	17	19	-2
5	11	23	-12	9	17	-8
Sum	**64**	**118**	**-54**	**37**	**61**	**-24**

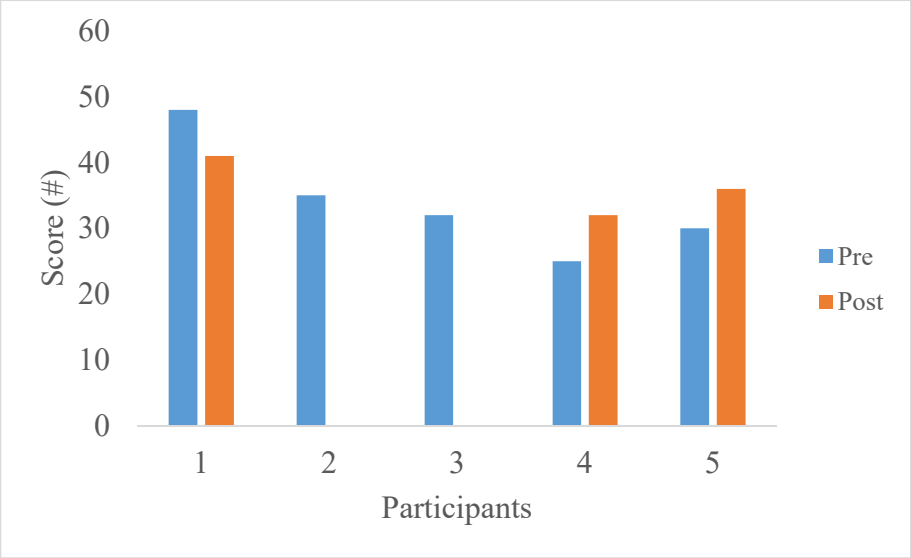

Figure 1. Exercise Confidence survey scores of the participants' pre- and post-intervention.

Appendix A

Processes of Change (Experiential Processes)

	Explanation	**Appropriate Stage of Change**
Consciousness Raising	Giving useful information and tips about exercise	Precontemplation Contemplation
Dramatic Relief	Uses emotions and feelings about health implications/benefits associated with exercising	Precontemplation Contemplation
Environmental Reevaluation	Exercise and its effect on the individual's family, friends, society in general	Precontemplation Contemplation
Self-Reevaluation	Exercise and its impact on an individual's self-image	Contemplation Preparation
Social Liberation	Society's view of importance of exercise	Precontemplation Contemplation

Process of Change (Behavioral Processes)

	Explanation	**Appropriate Stage of Change**
Self-Liberation	Belief that an individual can commit to exercise	Preparation Action
Helping Relationships	Use and support of others for exercise	Preparation Action Maintenance
Counterconditioning	Using positive thoughts and behaviors instead of negative ones	Action Maintenance
Reinforcement Management	Giving positive rewards for being active and not encouraging sedentary behavior	Action Maintenance
Stimulus Control	Using an individual's environment to promote more exercising cues	Action Maintenance

Adapted from Nigg (2014), with information coming from Figure 4.2 (p. 108) and Table 4.1 (p. 107).

Appendix B

TTM Stage Placement

The following five statements will assess how much you currently exercise in your leisure time (exercise done outside of a job). Regular exercise is any *planned* physical activity (e.g., brisk walking, jogging, bicycling, tennis, swimming, rowing) performed to increase physical fitness. This activity should be performed *3 or more* times per week for *20 or more minutes* per session to be considered at a level that increases your breathing rate and causes you to break a sweat.

Do you exercise regularly according to the definition above? Please mark only ONE of the five statements:

1. ____No, and I do not intend to begin exercising regularly in the next 6 months.
2. ____No, but I intend to begin exercising regularly in the next 6 months.
3. ____No, but I intend to begin exercising regularly in the next 30 days.
4. ____Yes, I have been, but for less than 6 months.
5. ____Yes, I have been for more than 6 months.

Appendix C

Participant ID: _____
Date: ___/___/___

Modifiable Activity Questionnaire

1. Please check the box of all activities that you have done during the past 7 days. For each activity that was checked ☑, write down the total # of minutes that you spent doing the activity per day.

Activity From_____ to _____	**Total # of Minutes per Day** SUN	MON	TUE	WED	THUR	FRI	SAT
☐ Bicycling, leisure, slow, light effort							
☐ Bicycling, leisure, moderate effort							
☐ Bicycling, stationary, general							
☐ Mild stretching							
☐ Water aerobics, water calisthenics							
☐ Weight lifting, light or moderate effort							
☐ Aerobics, general							
☐ Dancing, general							
☐ Cleaning, house or cabin, general							
☐ Putting away groceries (carrying)							
☐ Watering plants							
☐ Gardening, general							
☐ Jogging, general							
☐ Billiards							
☐ Bowling							
☐ Golf, general							
☐ Shuffleboard, lawn bowling							
☐ Table tennis, ping pong							
☐ Tai chi							
☐ Tennis, general							
☐ Hiking, cross country							
☐ Bird watching							
☐ Walking, household walking							
☐ Walking, level, brisk, walking for exercise							
☐ Swimming laps, freestyle, moderate or light effort							

☐ Other							
☐ Other							

☐ I did none of these activities over the past 7 days.

2. Was this week reflective of your usual activity levels? ☐ YES ☐ NO

3. Excluding time at work, in general how many HOURS per DAY do you usually spend watching television or working on a computer? _____ hours.

4. Over this past week, have you spent more than one day confined to a bed or chair as a result of an injury, illness, or surgery? ☐ YES ☐ NO

   If yes, how many days over the past week were you confined to a bed or chair? _____ days.

5. Do you have difficulty doing any of the following activities?
   a. Getting in or out of a bed or chair? ☐ YES ☐ NO
   b. Walking across a small room without resting? ☐ YES ☐ NO
   c. Walking for 10 minutes without resting? ☐ YES ☐ NO

For interviewer Only:
Check the box that best reflects the month that the physical activity data was collected in.
☐ June – Aug ☐ Sept – Nov ☐ Dec – Feb ☐ March – May

Appendix D

Exercise Confidence Survey

Below is a list of things people might do while trying to increase or continue regular exercise. We are interested in exercises like running, swimming, brisk walking, bicycle riding, or aerobics classes.

Whether you exercise or not, please rate how confident you are that you could really motivate yourself to do things like these consistently, *for at least six months.*

Please circle one number for each question.
How sure are you that you can do these things?

		I know I cannot		Maybe I can		I know I can	Does not apply
21.	Get up early, even on weekends, to exercise.	1	2	3	4	5	(8)
22.	Stick to your exercise program after a long, tiring day at work.	1	2	3	4	5	(8)
23.	Exercise even though you are feeling depressed.	1	2	3	4	5	(8)
24.	Set aside time for a physical activity program; that is, walking, jogging, swimming, biking, or other continuous activities for at least 30 minutes, 3 times per week.	1	2	3	4	5	(8)
25.	Continue to exercise with others even though they seem too fast or too slow for you.	1	2	3	4	5	(8)
26.	Stick to your exercise program when undergoing a stressful life change (e.g., divorce, death in the family, moving).	1	2	3	4	5	(8)
27.	Attend a party only after exercising.	1	2	3	4	5	(8)
28.	Stick to your exercise program when your family is demanding more time from you.	1	2	3	4	5	(8)

29.	Stick to your exercise program when you have household chores to attend to.	1	2	3	4	5	(8)
30.	Stick to your exercise program even when you have excessive demands at work.	1	2	3	4	5	(8)
31.	Stick to your exercise program when social obligations are very time consuming.	1	2	3	4	5	(8)
32.	Read or study less in order to exercise more.	1	2	3	4	5	(8)

October 7, 1988

Appendix E

Decisional Balance Scale

This section looks at positive and negative aspects of exercise. Read the following items and indicate how important each statement is with respect to your decision to exercise or not to exercise in your leisure time. Please answer using the following 5-point scale:

5 = Not Important

4 = A little bit important

3 = Somewhat important

2 = Quite important

1 = Extremely Important

If you disagree with a statement and are unsure how to answer, the statement is probably not important to you.

How important are the following opinions in your decision to exercise or not to exercise?

1. I would have more energy for my family and friends if I exercised regularly. ____
2. I would feel embarrassed if people saw me exercising. ____
3. I would feel less stressed if I exercised regularly. ____
4. Exercise prevents me from spending time with my friends. ____
5. Exercising puts me in a better mood for the rest of the day. ____
6. I feel uncomfortable or embarrassed in exercise clothes. ____
7. I would feel more comfortable with my body if I exercised regularly. ____
8. There is too much I would have to learn to exercise. ____
9. Regular exercise would help me have a more positive outlook on life. ____

10. Exercise puts an extra burden on my significant other. ____

Appendix F

Questions for interview at the end of the eight week curriculum.

1. Which parts of the curriculum did you feel were relevant to your everyday life?
2. What aspects of physical activity or exercise that weren't covered would you have liked to learn more about?
3. What did you enjoy about the exercises that were taught? What did you find challenging?
4. What exercise or health information do you think you will continue to use after the class ends?
5. Is there anything that would have helped you more to change your view on exercise?

Appendix H & H-1

James Madison University
Human Research Review Request

FOR IRB USE ONLY:				
Exempt:	☐	**Protocol Number:**	**1st Review:** _____	**Reviewer:** _____
Expedited:	☐	**IRB:** 18-0068	**2nd Review:** _____	**Reviewer:** _____
Full Board:	☒	**Received:** 08/18/17	**3rd Review:** _____	

Project Title:	The Effect of a Stage of Change Tailored Intervention on Physical Activity and Psychological States of Older Adults
Project Dates: (Not to exceed 1 year minus 1 day)	From: 08/28/17 To: 04/27/18 MM/DD/YY MM/DD/YY
Responsible Researcher(s):	Emilee Blosser
E-mail Address:	blosseea@dukes.jmu.edu
Telephone:	(540) 578-4202
Department:	KIN
Address (MSC):	
Please Select:	☐ Faculty ☒ Undergraduate Student ☐ Administrator/Staff Member ☐ Graduate Student
(if Applicable):	
Research Advisor:	Elizabeth Skidmore Edwards, PhD., Sarah Carson Sackett, PhD
E-mail Address:	edwardes@jmu.edu
Telephone:	(540) 568- 5220
Department:	KIN
Address (MSC):	2302
Minimum # of Participants:	4
Maximum # of Participants:	15
Funding:	**External Funding: Yes:** ☐ **No:** ☒ **If yes, Sponsor:** _____ **Internal Funding: Yes:** ☐ **No:** ☒ **If yes, Sponsor:** _____ **Independently: Yes:** ☐ **No:** ☒
Incentives:	**Will monetary incentives be offered? Yes:** ☐ **No:** ☒ **If yes: How much per recipient?** _____ **In what form?** _____
Must follow JMU Financial Policy:	http://www.jmu.edu/financemanual/procedures/4205.shtml#.394IRBApprovedResearchSubjects

Institutional Biosafety Committee Review/Approval:	**Use of recombinant DNA and synthetic nucleic acid molecule research:** ☐ Yes ☒ No **If "Yes," approval received:** ☐ Yes ☐ No ☐ Pending **IBC Protocol Number(s):** **Biosafety Level(s):**
Will research be conducted outside of the United States?	☐ Yes ☒ No **If "Yes," please complete and submit the International Research Form along with this review application:** http://www.jmu.edu/researchintegrity/irb/forms/irbinternationalresearch.docx.
Certain vulnerable populations are afforded additional protections under the federal regulations. Do human participants who are involved in the proposed study include any of the following special populations? **Some populations may be vulnerable to coercion or undue influence. Does your research involve any of the following populations?**	☐ Minors ☐ Pregnant women *(Do not check unless you are specifically recruiting)* ☐ Prisoners ☐ Fetuses ☒ My research does not involve any of these populations ☒ Elderly ☐ Diminished capacity/Impaired decision-making ability ☐ Economically disadvantaged ☐ Other protected or potentially vulnerable population *(e.g. homeless, HIV-positive participants, terminally or seriously ill, etc.)* ☐ My research does not involve any of these populations

Investigator: Please respond to the questions below. The IRB will utilize your responses to evaluate your protocol submission.

1. ☒ **YES** ☐ **NO** Does the James Madison University Institutional Review Board define the project as ***research?***

The James Madison University IRB defines "research" as a "*systematic* investigation designed to develop or contribute to *generalizable knowledge*." All research involving human participants conducted by James Madison University faculty and staff and students is subject to IRB review.

2. ☒ **YES** ☐ **NO** Are the human participants in your study ***living*** individuals?

"Individuals whose physiologic or behavioral characteristics and responses are the object of study in a research project. Under the federal regulations, human subjects are defined as: living individual(s) about whom an investigator conducting research obtains: (1) data through intervention or interaction with the individual; or (2) identifiable private information."

3. ☒ **YES** ☐ **NO** Will you obtain data through ***intervention*** or ***interaction*** with these individuals?

"Intervention" includes both physical procedures by which data are gathered (*e.g.*, measurement of heart rate or venipuncture) and manipulations of the participant or the participant's environment that are performed for research purposes. "Interaction" includes communication or interpersonal contact between the investigator and participant (*e.g.*, surveying or interviewing).

4. ☒ **YES** ☐ **NO** Will you obtain ***identifiable private information*** about these individuals?

"Private information" includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, or information provided for specific purposes which the individual can reasonably expect will not be made public (*e.g.*, a medical record or student record). "Identifiable" means that the identity of the participant may be ascertained by the investigator or associated with the information (*e.g.*, by name, code number, pattern of answers, etc.).

5. ☐ **YES** ☒ **NO** Does the study present ***more than minimal risk*** to the participants?

"Minimal risk" means that the risks of harm or discomfort anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during performance of routine physical or psychological examinations or tests. Note that the concept of risk goes beyond physical risk and includes psychological, emotional, or behavioral risk as well as risks to employability, economic well being, social standing, and risks of civil and criminal liability.

CERTIFICATIONS:

For James Madison University to obtain a Federal Wide Assurance (FWA) with the Office of Human Research Protection (OHRP), U.S. Department of Health & Human Services, **all** research staff working with human participants must sign this form and receive training in ethical guidelines and regulations. "Research staff" is defined as persons who have direct and substantive involvement in proposing, performing, reviewing, or reporting research and includes students fulfilling these roles as well as their faculty advisors. The Office of Research Integrity maintains a roster of all researchers who have completed training within the past three years.

Test module **at ORI website** http://www.jmu.edu/researchintegrity/irb/irbtraining.shtml

Name of Researcher(s) and Research Advisor	Training Completion Date
Emilee Blosser	**08/05/17**
Elizabeth Skidmore Edwards, PhD	**05/25/16**
Sarah Carson Sackett, PhD	**01/07/16**

For additional training interests, or to access a Spanish version, visit the National Institutes of Health Protecting Human Research Participants (PHRP) Course at: http://phrp.nihtraining.com/users/login.php.

By signing below, the Responsible Researcher(s), and the Faculty Advisor (if applicable), certifies that he/she is familiar with the ethical guidelines and regulations regarding the protection of human research participants from research risks. In addition, he/she agrees to abide by all sponsor and university policies and procedures in conducting the research. He/she further certifies that he/she has completed training regarding human participant research ethics within the last three years.

_____ _____
Principal Investigator Signature Date

_____ _____
Principal Investigator Signature Date

_____ _____
Principal Investigator Signature Date

_____ _____
Faculty Advisor Signature Date

Submit an electronic version (in a Word document) of your **ENTIRE** protocol to researchintegrity@jmu.edu.
Provide a **SIGNED** hard copy of the Research Review Request Form to:
Office of Research Integrity, MSC 5738, 601 University Boulevard, Blue Ridge Hall, Third Floor, Room # 342

Purpose and Objectives

Please provide a lay summary of the study. Include the purpose, research questions, and hypotheses to be evaluated. (Limit to one page)

The purpose of this study is to examine whether a tailored curriculum based on the Transtheoretical Model (TTM) is effective in changing a group of older adults' behaviors, decisional balance, and self-efficacy as it relates to physical activity. Decisional balance is defined as an acknowledgement of the fact that there are pros and cons to every decision, even those that are deemed healthy. Self- efficacy meaning how capable a person believes he/she is at performing an activity. The TTM model has five stages of behavior change known as precontemplation (no present plans to begin exercising in the next 6 months), contemplation (beginning to think about exercising, starting in 6 months), preparation (starting to make concrete plans to exercise in the next 30 days), action (engaging/ have been engaging in regular exercise for the past 6 months), and maintenance (exercising for more than 6 months and planning to continue) (Nigg, 2014). The stages of change show that behavior change is part of a continuing process, with progressive movement through the stages distinguished by different ways of thinking, levels of physical activity engagement, and responsiveness to specific processes of change. In order to progress to more advanced stages, it is advised that interventions be tailored such that stage-matched processes of change are addressed to help people evolve their thinking and behavior (Nigg, 2014). This study will use the TTM during part of the curriculum to guide participants in discussion about their physical activity habits. The curriculum will also incorporate low-intensity and simple exercises that can be done with minimal equipment so that the participants will have ways to continue physical activity on their own. If the tailored intervention is effective in helping the participants advance in their exercise attitudes and physical activity behaviors, the results will show a shift in the TTM stage placement of the participants. That shift will be identified by an increase in self-efficacy, more positive thoughts towards exercise/decisional balance, and an increased interest in physical activity.

Procedures/Research Design/Methodology/Timeframe

Describe your participants. From where and how will potential participants be identified (e.g. class list, JMU bulk email request, etc.)?

Four to fifteen participants, ages 50 and older, from the independent and assisted living communities within [redacted] will be contacted for participation in the intervention. Participants must be ambulatory and have no diagnosed conditions that affect cognition. Participants already members of the [redacted] will have filled out a Pre-Activity Screening Form provided by [redacted]. Participants that are not current members of the [redacted], but will be taking the class, will be asked to fill out the Pre-Activity Screening Form to assess their readiness for exercise. If a person becomes non-ambulatory during the process of that study, it would be up to that participant and their physician, in consultation with the research staff, to determine if continuing to participate is appropriate and safe.

How will subjects be recruited once they are identified (e.g., mail, phone, classroom presentation)? Include copies of recruitment letters, flyers, or advertisements.

Participants will be recruited using an approved flyer that will be hung around [redacted]. Information about the class may also be included in a newsletter that goes out to residents of [redacted].

Describe the design and methodology, including all statistics, IN DETAIL. What exactly will be done to the subjects? If applicable, please describe what will happen if a subject declines to be audio or video-taped.

Participants will meet weekly for eight weeks at [redacted]. A pre-assessment of the participant's TTM stage of change, physical activity levels, self-efficacy, and decisional balance will be evaluated using surveys (Appendix B-E). The participants' attitudes towards exercise, using the TTM scale, will be assessed every two weeks so as to appropriately categorize participants into intervention groups. Physical activity levels, self-efficacy, and decisional balance will only be assessed pre- and post-intervention. The intervention curriculum will cover topics to educate the elderly about exercise, empower them to make healthy lifestyle changes/choices, and help them positively view exercise. Movement through stages of the TTM model will also be assessed with an audio-recorded interview (Appendix F) following the end of the curriculum. If a participant declines to be audio recorded, the researcher will ask them to complete a one-on-one interview at a separate time – during which they will take hard copy notes. All interviews will take place in a classroom with a closed door to protect the privacy of non-participants from being recorded.

The primary responsibility of the participant will be to attend class ready to participate. Depending on the week, the Stages of Change Questionnaire will be given out for the participants to complete. Then the researcher will present the health education topic for the week to the whole class. Topics for the curriculum include an introduction to exercise safety and advice for exercise based on the Department of Health and Human Services recommendations. Participants will also be asked to create exercise goals using the S.M.A.R.T. goal method. Other topics include weight management, body composition, aerobic vs. resistance exercise, and health benefits of exercise.

After the health education topic, the participants will then be asked to get into groups based on their self-identified stage of change. The stage of change groups are based on the TTM where there are five stages of change. These stages reflect where the participants are along the continuum of being likely to make and keep a behavior change. The stage of change groups will receive education based on stage-relevant processes of change to help the participants think about physical activity, themselves, and related factors in a way that helps them move to the next stage of change (which would reflect a greater motivation to adopt exercise as a lifelong behavior). The researcher will pick one stage-matched process of change for each group to focus on per week. The researcher will develop questions/activities to facilitate discussion pertaining to that processes of change. For example, an action group might be asked to focus on one of the processes of change, helping relationships, by thinking of who they can gain support from to help them adhere to their physical activity plans.

The participants will then come back together as a group, and the researcher will explain the exercise being taught for that week. The researcher will also demonstrate each exercise to aid in the participants' understanding. Exercises taught will include walking, simple muscular strength and endurance exercises, ankle pumps/calf stretching, and core exercises. Prescribed physical activities will serve the average abilities of the age range (50+), with included modifications to allow participants to adjust to their ability level.

Questionnaires: (Appendix B-E)

B. TTM stage placement: Determines a participant's stage of change according to the TTM.
C. Modifiable Activity Questionnaire (MAQ): Evaluates the participant's activity level over a week span.
D. Exercise Confidence Survey: Determines the participant's self-efficacy as it relates to exercise and how confident they are at incorporating exercise into their daily lives.
E. Decisional Balance Scale: Assesses whether people use positive or negative reasons to exercise.
F. Questions for end-of-intervention interview

Emphasize possible risks and protection of subjects.

Possible risks to the participants are no greater than participating in physical activity at [redacted], however, this risk does include the risk of falls. The participants will not be using big or complicated exercise equipment that could pose a risk, nor will the exercise be strenuous. There could be minimal risk when the participants perform the exercise for the week, but that should not exceed the minimal amount of risk already associated with exercise. As people age, the risk of falling while being physically active increases. In this study, we will offer chair and supported versions to minimize the risking of falling.

Due to working with the vulnerable population, the elderly, protection of the subjects will include making sure that the curriculum is appropriate for the age group. Appropriateness of the curriculum will be determined by having the coordinator at the facility approve the information.

All hardcopies with identifiable information will be kept in locked filing cabinet in Dr. Edwards's office.

What are the potential benefits to participation and the research as a whole?

A potential benefit that the participants may experience is a better understanding of how they perceive exercise. Once knowing their attitudes towards exercise, their desire to engage in physical activity (and resulting activity) could increase. If the participants perform more physical activity, they could experience improved physical and mental health. The research as a whole has the potential to help with understanding the attitudes that older adults hold towards exercise, and appropriate ways to encourage older adults to engage in more physical activity. We will also be examining the efficacy of a stage-tailored physical activity intervention to this understudied population.

Where will research be conducted? (Be specific; if research is being conducted off of JMU's campus a site letter of permission will be needed)

[redacted], Harrisonburg, VA.

Will deception be used? If yes, provide the rationale for the deception. Also, please provide an explanation of how you plan to debrief the subjects regarding the deception at the end of the study.

No

What is the time frame of the study? (List the dates you plan on collecting data. This cannot be more than a year, and you cannot start conducting research until you get IRB approval)

The first class for the intervention will start in October 2017 (pending IRB approval) and conclude in November/December 2017.

Data Analysis

How will data be analyzed?

Data will be analyzed with Microsoft Excel and SPSS 24.

How will you capture or create data? Physical (ex: paper or tape recording)? Electronic (ex: computer, mobile device, digital recording)?
Data will be collected using hard copy questionnaires. The interview will be captured with an audio-only recording. Recordings will be made with a University-owned iPad that has a passcode lock and is kept in a locked office. The interview will then be transcribed, using no identifiable information. The data will be transcribed within 2 weeks following the completion of the intervention, after which the recording will be destroyed. During transcription, subjects will be identified as Persons A, B, C, etc. There will be no attempt to link the interviews with the specific questionnaire data.

Do you anticipate transferring your data from a physical/analog format to a digital format? If so, how? (e.g. paper that is scanned, data inputted into the computer from paper, digital photos of physical/analog data, digitizing audio or video recording?)
Yes, data will be scored and input into an Excel spreadsheet and SPSS data file

How and where will data be secured/stored? (e.g. a single computer or laptop; across multiple computers; or computing devices of JMU faculty, staff or students; across multiple computers both at JMU and outside of JMU?) If subjects are being audio and/or video-taped, file encryption is highly recommended. If signed consent forms will be obtained, please describe how these forms will be stored separately and securely from study data.
Data will be stored on researchers' password-protected computers. No identifiable information or information linking identifiable information will be stored electronically. Signed consent forms will be kept in Dr. Edwards locked office. Surveys will be kept in the Morrison Bruce Center, which is also kept locked. Data will be kept for three years following entry into excel / SPSS, after which it will be destroyed. Upon completion, questionnaires will be transported to the MBC within 24 hours and data entry will occur within the MBC. During the interim, questionnaires will be kept in the locked car of a research team member, which is solely for transportation from [redacted] to JMU and will never be for more than 24 hours.

Who will have access to data? (e.g. just me; me and other JMU researchers (faculty, staff, or students); or me and other non-JMU researchers?)
The research staff will have access to the data. Identifiable information will not be converted to electronic. The de-identified data will be shared via university email accounts and stored on password protected computers. Facility coordinators at [redacted] will only have access to information regarding who is participating in the program. Results will only be shared in aggregate.

If others will have access to data, how will data be securely shared?
n/a

Will you keep data after the project ends? (i.e. yes, all data; yes, but only de-identified data; or no) If data is being destroyed, when will it be destroyed, and how? Who will destroy the data?
Yes, but only de-identified data.

Reporting Procedures
Who is the audience to be reached in the report of the study?

The audience for the study include professionals and researchers who are interested in gerontology and the role that attitudes and motivation towards exercise can play on a person's health habits.

How will you present the results of the research? (If submitting as exempt, research cannot be published or publicly presented outside of the classroom. Also, the researcher cannot collect any identifiable information from the subjects to qualify as exempt.)
The results of this research will be presented at the Department of Kinesiology Honors Symposium during the spring 2018 school semester.

How will feedback be provided to subjects?
Feedback will be given to participants following the end of the intervention about their TTM stages of change.

Experience of the Researcher (and advisor, *if student)*:
Please provide a paragraph describing the prior relevant experience of the researcher, advisor (if applicable), and/or consultants. If you are a student researcher, please state if this is your first study. Also, please confirm that your research advisor will be guiding you through this study.

1. Emilee Blosser, Undergraduate. Is a fourth-year Kinesiology student at James Madison University with an exercise science concentration, pre-physical therapy. This is her first study, and she will be working under the guidance Dr. Elizabeth Edwards and Dr. Sarah Carson Sackett throughout this study.

2. Elizabeth Skidmore Edwards, Ph.D. received her doctorate in Exercise Physiology in 2011 from the University of Miami. Dr. Edwards is an assistant professor in the Department of Kinesiology, as well as the Executive Director of the Morrison-Bruce Center for the Promotion of Physical Activity for Girls and Women. She has taught courses in exercise physiology for ten years. In addition, she has conducted numerous studies involving exercise testing and prescription across all ages at the University of Miami and James Madison University.

3. Sarah Carson Sackett, Ph.D. received her doctorate in Kinesiology in 2010 from Michigan State University with an emphasis in Sport Psychology and a cognate in Human Growth and Motor Development. Dr. Carson Sackett is currently an Associate Professor in the Department of Kinesiology, as well as the Associate Director of the Morrison-Bruce Center for the Promotion of Physical Activity for Girls and Women. She has taught courses in sport psychology for nine years and in motor development for five. Additionally, she has conducted previous studies in the areas of physical activity and behavior change.

Appendix H-1

Informed Consent
Consent to Participate in Research

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Dr. Elizabeth S. Edward, Dr. Sarah Carson Sackett, and Ms. Emilee Blosser from James Madison University. The purpose of this study is to determine whether an intervention that is tailored to your current feelings about physical activity can help you improve in self-efficacy, decisional balance, attitudes towards, and actual level of physical activity. Self-efficacy is how capable a person believes he/she is at performing an activity or behavior, which usually influences their choice to perform that certain activity or behavior. Decisional balance is an acknowledgement of the fact that there are pros and cons to every decision, even those that are deemed healthy. To best empower people to make the best choice, we have to acknowledge both sides of each decision and help them decide the balance for themselves. This study will contribute to the researcher's completion of her senior thesis.

Eligibility

This study is open to persons aged 50 or older who can currently walk on their own or with minor assistance (e.g. from a walker). Participants should also not have been diagnosed with or be under treatment for a condition that is known to affect your ability to make decisions, such as Alzheimer's disease. If you have been diagnosed with a condition that affects your ability to process information or if you currently cannot walk, then this study is not appropriate for you.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. If already a member of the [redacted], you will not have to fill out another Pre-Activity Screening Form. However, if you are not a current member of [redacted], you will be asked to fill out the Pre-Activity Screening Form to assess your readiness for exercise. This study consists of a curriculum, surveys as listed below, and a final interview that will be administered to individual participants at [redacted]. The first questionnaire, TTM stage placement, will be given as a pre- and post-measurement as well as every two weeks to track your progress through the TTM stages. The Modifiable Activity Questionnaire (MAQ), Exercise Confidence Survey, and Decisional Balance Scale will be given pre- and post-curriculum. A structured interview, lasting 5-10 minutes will also be conducted at the end of the curriculum. All interviews will take place in a classroom with the door closed. Interviews will be audio recorded, and then transcribed by the researcher within 2 weeks of conducting the interviews. If you prefer to not be audio-recorded, then you may speak with the interviewer one-on-one to give your input without being recorded. We will not be linking your Questionnaire data with your interview. The interview is simply to get more information about if you thought the curriculum was effective, enjoyed the exercises taught, and/or if the health information was helpful to you.

Questionnaires (*Please ask Ms. Blosser if you'd like to see any questionnaire before consenting)*:

1. TTM stage placement: Determines what stage of the Transtheoretical Model (TTM) of behavior change you are in.
2. Modifiable Activity Questionnaire (MAQ): Evaluates your activity level over a week span.

3. Exercise Confidence Survey: Determines how confident you are at incorporating exercise into your daily lives.
4. Decisional Balance Scale: Assesses what reasons, whether positive or negative, you choose to exercise

Curriculum

Each class will be split into three parts. The first part of the class is the health education curriculum, during which the researcher will take you through different health/exercise lessons. The next part of the curriculum will have you get into pre-determined groups based on your TTM stage placement survey results. The Transtheoretical Model of behavior change that this part of the curriculum is based on shows that behavior change is part of a continuing process. Within the model are five stages of behavior change known as precontemplation (no present plans to begin exercising in the next 6 months), contemplation (beginning to think about exercising, starting in 6 months), preparation (starting to make concrete plans to exercise in the next 30 days), action (engaging/ have been engaging in regular exercise for the past 6 months), and maintenance (exercising for more than 6 months and planning to continue). You will determine where along this spectrum you fall, so that activities are most tailored to helping you move along the spectrum. When people move through the stages they experience different ways of thinking, levels of physical activity engagement, and responsiveness to specific processes of change. Each of your groups will receive education based on stage-relevant strategies to help you think about physical activity, yourself, and related factors in a way that will help you become more committed to being physically active. This period will involve discussion in your small groups. The final part of the class will involve the exercise of the week. The researcher will explain and demonstrate the exercise, and you will have time to practice the exercise as well. The exercises can be modified to best accommodate your current ability level.

Time Required

Participation in this study will require 50 minutes of your time, once a week, for an 8-week period. You may be asked to continue to practice and perform the exercises that you learned for that week outside the class, which may take some extra time.

Risks

Possible risks to you are no greater than those risks associated with participating in physical activity at [redacted] or anywhere else. You will not be using big or complicated exercise equipment that could pose a risk. There could be minimal risk when you perform the exercise for the week, but that should not exceed the amount of risk already associated with exercise. As we age, the risk of falling while being physically active increases. This risk should be taken seriously. It is important that both during this study and when being active in general, you take care to perform exercises and use equipment that minimizes this risk. In this study, we will offer chair and supported versions of the exercises to minimize the falling risk.

Benefits

Potential benefits that you may experience are a better understanding of how you perceive exercise and greater physical activity. Once knowing your attitudes towards exercise, your desire to engage in physical activity could increase, which could lead to improved physical and mental health. The research,

as a whole, has the potential to help with understanding the attitudes that older adults hold towards exercise and appropriate ways to encourage older adults to engage in more physical activity.

Confidentiality

The results of this research will be presented at the honors symposium on campus at JMU. The results of this project will be coded in such a way that the respondents' identities will not be made publically available. The researchers retain the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented, representing averages or generalizations about the responses as a whole. All data will be stored in a secure location accessible only to the researchers. Upon completion of the study, all information that matches up individual respondents with their answers will be destroyed.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Emilee Blosser
Kinesiology
James Madison University
(540) 578-4202
blosseea@dukes.jmu.edu

Dr. Elizabeth S. Edwards
Kinesiology
James Madison University
(540) 568-5220
edwardes@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board
James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age.

_____ By initialing, I give consent to be audio taped during the interview at the end of this intervention.

_____
Name of Participant (Printed)

_____ _____
Name of Participant (Signed) Date

_____ _____

Name of Researcher (Signed) Date